Wu-chun Feng

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Office Address:
Los Alamos National Laboratory
Research & Development in Advanced Network Technology (RADIANT)
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(505) 672-0788

Research Interests

networking (high performance and large scale), protocol design, TCP, Internet, real-time systems

Education

8/90 – 5/96 University of Illinois at Urbana-Champaign, Urbana, IL GPA: 5.00/5.00
Ph.D. in Computer Science
Thesis: *Applications and Extensions of the Imprecise-Computation Model*
Advisor: Professor Jane W.-S. Liu

8/88 – 12/89 The Pennsylvania State University, University Park, PA GPA: 4.00/4.00
M.S. in Computer Engineering
Thesis: *A Learn-by-Example, Natural-Language Processor Based on Case-Frame Instantiation*
Advisor: Professor Rangachar Kasturi

8/84 – 5/88 The Pennsylvania State University, University Park, PA GPA: 3.82/4.00
B.S. in Computer Engineering
Thesis: *A Natural-Language Interface for a Paper-Based Map Information System*
Advisor: Professor Rangachar Kasturi
B.S. Honors in Music
Thesis: *Compositions in Popular Music for the Piano*
Advisor: Professor W. Bruce Trinkley

Professional Experience

10/00 – now *Team Leader & Technical Staff Member*, Research & Development in Advanced Network Technology (RADIANT), Los Alamos Nat'l Lab, Los Alamos, NM
- Staff: 5 team members and 5 cross-team collaborators.
- Technical leadership over seven areas: computational grids, network traffic characterization, high-performance TCP, high-speed network interface cards, OS-bypass protocols, distributed resource management, and active queue management

4/00 – now *Adjunct Assistant Professor*, Ohio State University, Computer & Information Science, Columbus, OH
- Research collaboration with Los Alamos National Laboratory
- M.S / Ph.D. thesis advising

5/99 – now *Founder & Director*, Los Alamos Nat'l Lab., Advanced Summer Curriculum for Emerging Network Technology (ASCENT), Los Alamos, NM
- A focused and intense program for students interested in research in high-performance networking.

12/98 – 10/00 *Technical Lead & Technical Staff Member*, Los Alamos National Laboratory, Los Alamos, NM
- Distributed computational grids
- Network traffic characterization
- High-performance TCP
- High-speed network interface cards
- OS-bypass protocols (ST, VIA, PM)
- Distributed resource management, i.e., co-scheduling / gang scheduling

11/98 – now *Institute Fellow*, Los Alamos Nat'l Lab., Los Alamos Computer Science Institute, Los Alamos, NM
- "Think tank" for fundamental research in computer science & engineering.

10/98 – 10/00 *Adjunct Assistant Professor*, Purdue University, Electrical & Computer Engineering, West Lafayette, IN
- Research collaboration with Los Alamos National Laboratory

9/98 – 12/98 *Technical Staff Member*, Los Alamos National Laboratory, Network Engineering, Los Alamos, NM
- Network traffic characterization
- TCP congestion-control over high-speed networks

8/96 – 5/98 *Assistant Professor*, University of Illinois at Urbana-Champaign, Computer Science, Urbana, IL
- Teaching: computer architecture, software engineering, and networks
- Research: real-time systems, networks, and multimedia (see work at Vosaic)

2/97 – 6/97 *Research Scientist*, Vosaic Corporation, Urbana, IL
- VDP: Video Datagram Protocol (streaming of audio and video over the Internet)
- AC-3™: Java-based real-time audio decoder

8/92 – 8/96 *Research Assistant*, University of Illinois at Urbana-Champaign, Computer Science, Urbana, IL
- Real-time systems and networks
- End-to-end scheduling
- Imprecise computation

6/93 – 8/93 *Research Consultant*, NASA Ames Research Center, Spacecraft Data Systems, Mt. View, CA
- Space Station Freedom (now International Space Station)

8/91 – 8/92 *Research Assistant*, University of Illinois at Urbana-Champaign, Computer Science, Urbana, IL
- Performance metering & compiler optimization of concurrent object-oriented programs

8/90 – 8/91 *Teaching Assistant*, University of Illinois at Urbana-Champaign, Computer Science, Urbana, IL
- Artificial intelligence (Fall 1990) and object-oriented programming (Spring 1991)

1/90 – 7/90 *Applications Research Programmer*, IBM T.J. Watson Research Center, Yorktown Heights, NY
- Project: Systems integration and research of speech, handwriting, and gesture recognition systems

8/88 – 12/89 *Teaching Fellow*, Penn State University, Electrical Engineering, University Park, PA
- Digital design & VLSI system design
- Electrical circuits and power distribution

7/88 – 8/88 *Technical Coordinator*, NSF Young Scholars Academy, Penn State University, University Park, PA
- Computer curriculum development
- Software development & maintenance

Publications

Textbook

R. Devon and W. Feng, *Fortran at the Keyboard*, Kendall/Hunt Publishing Company, Dubuque, IA, 9/89.

Journal & Magazine

F. Petrini and W. Feng, "Improved Resource Utilization with Buffered Coscheduling," *Journal of Parallel Algorithms & Applications* (Special Issue), 2000.

F. Petrini and W. Feng, "Time-Sharing Parallel Jobs in the Presence of Multiple Resource Requirements," To appear in *Lecture Notes in Computer Science*, Vol. 1911, 2000. (A preliminary version of this paper appeared in the *Workshop on Job Scheduling Strategies for Parallel Processing*.)

W. Feng and J. W.-S. Liu, "Algorithms for Scheduling Real-Time Tasks with Input Error and End-to-End Deadlines," *IEEE Transactions on Software Engineering*, 2/97.

A. Chien, W. Feng, V. Karamcheti, and J. Plevyak, "Techniques for Efficient Execution of Concurrent Object-Oriented Programs," *Lecture Notes in Computer Science*, Vol. 757, 1993. (A preliminary version of this paper appeared in the *Workshop on Languages and Compilers for Parallel Computing*.)

R. Kasturi, R. Fernandez, M. Amlani, and W. Feng, "Map Data Processing in Geographic Information Systems," *IEEE Computer*, 12/89.

Conference (Refereed)

E. Weigle and W. Feng, "A Case for TCP Vegas in High-Performance Computational Grids," *10th IEEE International Symposium on High-Performance Distributed Computing*, San Francisco, CA, 8/01.

A. Kapadia, A. Feng, and W. Feng, "The Effects of Inter-Packet Spacing on the Delivery of Multimedia Content," *21st IEEE International Conference on Distributed Computing Systems (ICDCS 2001)*, Phoenix, AZ, 4/01.

W. Feng and P. Tinnakornsrisuphap, "The Failure of TCP in Distributed Computational Grids," *SC 2000: High-Performance Networking and Computing Conference*, Dallas, TX, 11/00.

W. Feng, "Network Traffic Characterization of TCP," *IEEE MILCOM 2000*, Los Angeles, CA, 10/00.

W. Feng and P. Tinnakornsrisuphap, "The Adverse Impact of the TCP Congestion-Control Mechanism in Heterogenous Computing Systems," *International Conference on Parallel Processing (ICPP 2000)*, Toronto, Canada, 8/00.

F. Petrini and W. Feng, "Buffered Co-Scheduling: A New Methodology for Multitasking Parallel Jobs on Distributed Systems," *IEEE International Parallel & Distributed Processing Symposium (IPDPS 2000)*, Cancun, Mexico, 5/00.

P. Tinnakornsrisuphap, W. Feng, and I. Philp, "On the Burstiness of the TCP Congestion-Control Mechanism in a Distributed Computing System," *20th IEEE International Conference on Distributed Computing Systems (ICDCS 2000)*, Taipei, Taiwan, 4/00.

F. Petrini and W. Feng, "Scheduling with Global Information in Distributed Systems," *20th IEEE International Conference on Distributed Computing Systems (ICDCS 2000)*, Taipei, Taiwan, 4/00.

F. Petrini and W. Feng, "Efficient Resource Utilization on a Massively Parallel System," *7th International Conference on Advanced Computing and Communications (ADCOM '99)*, Roorkee, India, 12/99.

D. Tolmie, T. M. Boorman, A. DuBois, D. DuBois, W. Feng, and I. Philp, "From HiPPI-800 to HiPPI-6400: A Changing of the Guard and Gateway to the Future," *6th International Conference on Parallel Interconnects (PI '99)*, Anchorage, AK, 10/99.

W. Feng, "Dynamic Client-Side Scheduling in a Real-Time CORBA System," *23rd International Computer Software and Applications Conference (COMPSAC 99)*, Phoenix, AZ, 10/99.

W. Feng, "Extending CORBA for Soft Real-Time Applications," *International Conference on Networks and Communication Systems*, Pittsburgh, PA, 5/98.

W. Feng, "An In-Depth Study of Multimedia Traffic Control Over ATM," *International Conference on Networks and Communication Systems*, Pittsburgh, PA, 5/98.

D. Hull, W. Feng, and J. W.-S. Liu, "Operating System Support for Imprecise Computation," *AAAI Fall Symposium on Flexible Computation*, Cambridge, MA 11/96.

W. Feng and J. W.-S. Liu, "Performance of a Congestion-Control Scheme on an ATM Switch," *International Conference on Networks*, Orlando, FL, 1/96.

W. Feng, D. L. Hull, and J. W.-S. Liu, "Enhancing the Performance and Dependability of Real-Time Systems," *IEEE International Computer Performance and Dependability Symposium*, Erlangen, Germany, 4/95.

V. Lopez-Millan, W. Feng, and J. W.-S. Liu, "Using the Imprecise-Computation Technique for Congestion Control on a Real-Time Traffic Switching Element," *IEEE International Conference on Parallel and Distributed Systems*, Hsinchu, Taiwan, R.O.C., 12/94.

W. Feng, "Parallel Spinodal Decomposition," *26th Annual Summer Computer Simulation Conference*, San Diego, CA, 7/94.

W. Feng, "An Intelligent System for Map Data Processing in Geographic Information Systems," *International Conference on Intelligent Information Management Systems*, Washington, D.C., 6/94.

W. Feng, "Using Handwriting and Gesture Recognition to Correct Speech-Recognition Errors," *10th International Conference on Advanced Science and Technology*, Chicago, IL, 3/94.

W. Feng, "A Natural Language Interface to Paper-Based Maps," *ACM 3rd International Conference on Human-Computer Interaction*, Boston, MA, 9/89.

Workshop (Refereed)

F. Petrini, A. Hoisie, W. Feng, and R. Graham, "Performance Evaluation of the Quadrics Interconnection Network," *IEEE Workshop on Communication Architectures for Clusters (in conjunction with the IEEE International Parallel & Distributed Processing Symposium)*, San Francisco, CA, 4/01.

E. Weigle, W. Feng, and M. Gardner, "Why TCP Will Not Scale for the Next-Generation Internet," *11th IEEE Workshop on Local and Metropolitan Area Networks (LANMAN 2001)*, Boulder, CO, 3/01.

W. Feng, "The Future of High-Performance Networking," *Workshop on New Visions for Large-Scale Networks: Research & Applications*, Invited Paper, Vienna, VA, 3/01. (Sponsors: Federal Large-Scale Networking Working Group, DARPA, DOE, NASA, NIST, NLM, and NSF.)

W. Feng, "The Design of an Open Real-Time System Using CORBA," *IEEE Workshop on Multimedia Network Systems (in conjunction with the International Conference on Parallel Processing)*, 9/99.

W. Feng, U. Syyid, and J. W.-S. Liu, "Providing for an Open Real-Time CORBA," *IEEE Workshop on Middleware for Distributed Real-Time Systems and Services (in conjunction with the IEEE Real-Time Systems Symposium)*, 12/97.

W. Feng and J. W.-S. Liu, "Time-Constrained Speech Processing and Generation," *IEEE Workshop on Real-Time Applications*, New York, NY, 5/93.

A. Chien and W. Feng, "Efficient Implementation of Concurrent Object-Oriented Programs," *5th Workshop on Languages and Compilers for Parallel Computing*, 5/92.

A. Chien and W. Feng, "GST: Grain-Size Tuning for Efficient Execution of Symbolic Programs," *Workshop on Compilation of Symbolic Languages for Parallel Computers*, San Diego, CA, 10/91.

Invited Talks & Colloquia

The Future of High-Performance Networking, Workshop on New Visions for Large-Scale Networks: Research & Applications, Vienna, VA, 3/01. (Sponsors: Federal Large Scale Networking Working Group, DARPA, DOE, NASA, NIST, NLM and NSF.)
The Failure of TCP over High-Performance Computational Grids, U. of Illinois at Urbana-Champaign, 1/01.
Buffered Coscheduling: A New Methodology for Multitasking Parallel Jobs on Distributed Systems, U. of Oregon, 6/00.
Network Traffic Characterization of TCP in Distributed Computational Grids, U. of Oregon, 6/00.
High-Performance Networking in Parallel Computing Systems, Ohio State U., 1/00.
Buffered Coscheduling: A New Methodology for Multitasking Parallel Jobs on Distributed Systems, U.of Utah, 1/00.
High-Performance Networking in Distributed Computational Grids, U. of Illinois at Urbana-Champaign, 11/99.
Network Interface Cards as First-Class Citizens, Ohio State U., 11/99.
Applications & Extensions to the Imprecise-Computation Model, U. of Virginia, 1/98.

Professional Activities

Invited Panels

The Adequacy of TCP for High-Performance Computing, SC 2000, November 2000.
Real-Time CORBA, IEEE Real-Time Systems Symposium, December 1997.

Program Chairs and Vice-Chairs

Program Vice-Chair, 28th International Conference on Parallel Processing, 1999.

Program Committees

26th IEEE International Conference on Local-Area Networks, 2001.

10th IEEE International Symposium on High-Performance Distributed Computing, 2001.
Workshop on Scheduling and Resource Management for Cluster Computing (held in conjunction with the 2001 International Conference on Parallel Processing), 2001.
Workshop on Communication Architecture for Clusters (held in conjunction with the International Parallel & Distributed Processing Symposium), 2001.
12th IEEE/ACM SC 2000: High-Performance Networking and Computing Conference (Area: Architecture, Networks, and Distributed Computing), 2000.
28th International Conference on Parallel Processing, 1999.

Proposal Review Committees and Panels

NSF CISE Computer-Communications Research / Information Technology Research, 2001.
DOE Laboratory-Directed Research & Development (Directed Research), Los Alamos National Laboratory, 2001.
DOE ASCI Alliance Tri-Lab Strategic Team, DOE ASCI, 2000-2001.
DOE Laboratory-Directed Research & Development (Exploratory Research), Computer Science & Software Engineering, Los Alamos National Laboratory, 1999.
NSF CISE Experimental & Integrative Activities, 1998.

Session Chairs

QoS & Fault Tolerance, 12th IEEE/ACM SC 2000, November 2000.
Message Passing, 29th International Conference on Parallel Processing, August 2000.
Interconnection Networks & Network Processors, 14th ACM International Conference on Supercomputing, May 2000.
Network Routing & Deadlock, 28th International Conference on Parallel Processing, September 1999.

Journal Reviewing

IEEE Transactions on Parallel & Distributed Systems, 2000-2001.
IEEE Transactions on Computers, 1995 and 2000.
IEEE Transactions on Software Engineering, 1997. (See January 1998 issue.)
IEEE Computer, 1996. (Senior Referee Designation. See December 1996 issue.)

Miscellaneous

Reviewer, IEEE Real-Time Systems Symposium (1994-1996), IEEE Real-Time Technology & Applications Symposium (1995-1996), IEEE International Conference on Distributed Computing Systems (1995), IEEE Workshop on Real-Time Applications (1994).
Undergraduate Advisor, Dept. of Computer Science, University of Illinois at Urbana-Champaign, 1993-1996.
Member of the ACM, 1989-present.
Member of IEEE and IEEE Computer Society, 1988-present.
Coordinator of *Engineering Envoys for Computer Engineering*, 1988.
Founder & Coordinator of the *Fortran Lecture Series*, 1988.
Vice-President of *Eta Kappa Nu* Honor Society, Penn State University branch, 1987-1988.

Thesis Supervision

Houssain Kettani, *Network Traffic Characterization of Internet-Based Traffic*, University of Wisconsin at Madison, Electrical & Computer Engineering, M.S. Thesis, 6/02 (expected).
Peerapol Tinnakornsrisuphap. *The Design of an Integrated TCP*. University of Wisconsin at Madision, Electrical & Computer Engineering, M.S. Project Thesis, 6/00.
Umar Syyid. *An Open Real-Time CORBA*. University of Illinois at Urbana-Champaign, Computer Science, M.S. Thesis, 5/98.

Awards & Recognition

Certificate of Appreciation, Women's Career Development Mentoring Award, 2000.
Outstanding Mentor Award, 2000.
International Who's Who in Information Technology, 1998.
Senior Referee, IEEE Computer Society, 1996. (See December 1996 issue of IEEE Computer)
Conference Travel Grant Award, Fall 1994.

Conference Travel Grant Award, Spring 1994.
Best Paper Award, 10th Annual International Conference on Advanced Science and Technology, 1994.
Outstanding Teaching Assistant Award, 1991.
The Pennsylvania State University Dean's Fellowship, 1988-1989.
Larson Award, IEEE Computer Society, 1988.
Student Marshal (Magna Cum Laude) in Computer Engineering, 1988.
Best Student Paper, IEEE Pennsylvania Beta Chapter, 1988.
National Finalist in the Clara Wells Piano Competition, 1983.

Honor Societies

Phi Kappa Phi Honor Society
Tau Beta Pi Engineering Honor Society
Eta Kappa Nu Electrical & Computer Engineering Honor Society
Golden Key Honor Society
National Society of Professional Engineers

Hobbies

Sports: cycling (Category 3 / Master's 30+), ultimate frisbee, weightlifting, skiing (x-c & downhill), running, racquetball, squash, tennis, and basketball

Music: piano – performance and composition